



**King County**

# **City of Carnation Wastewater Treatment System**

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**Tour for the Metropolitan Water Pollution Abatement Advisory  
Committee**

**September 26, 2007**

# City/County Partnership in 2002

## City

- ✓ collection system
- ✓ side sewers

## County

- ✓ builds and operates treatment and discharge system
- ✓ treatment staffing and expertise

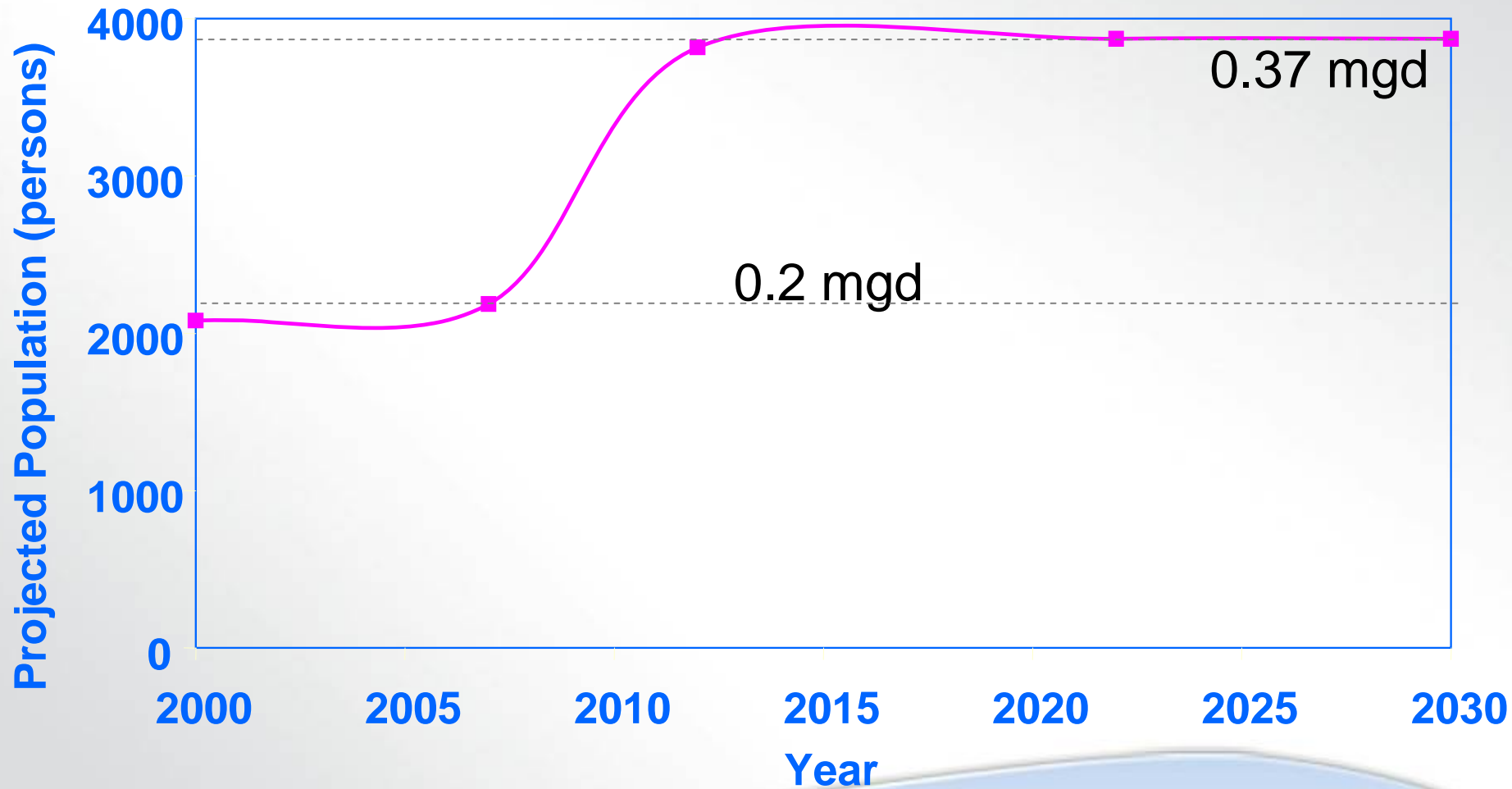


# Project Goals

- ✓ High quality effluent
- ✓ Reliability
- ✓ Minimize capital cost
- ✓ Minimize plant operation costs
- ✓ Automated facility



# Carnation Service Area Projections



# Project Budget

WTD total project cost– ~ \$20 million

State Revolving Fund Loans:

- ✓ \$1.2 million for design
- ✓ \$14 million for construction

# Why MBRs

- ✓ Permitting for fresh water discharge
- ✓ Sensitive environment (endangered species)
- ✓ “Critical Aquifer Recharge” designation
- ✓ Reduced footprint
- ✓ Flexibility for future discharge regulations
- ✓ Reliable and redundant design for Class A reclaimed water



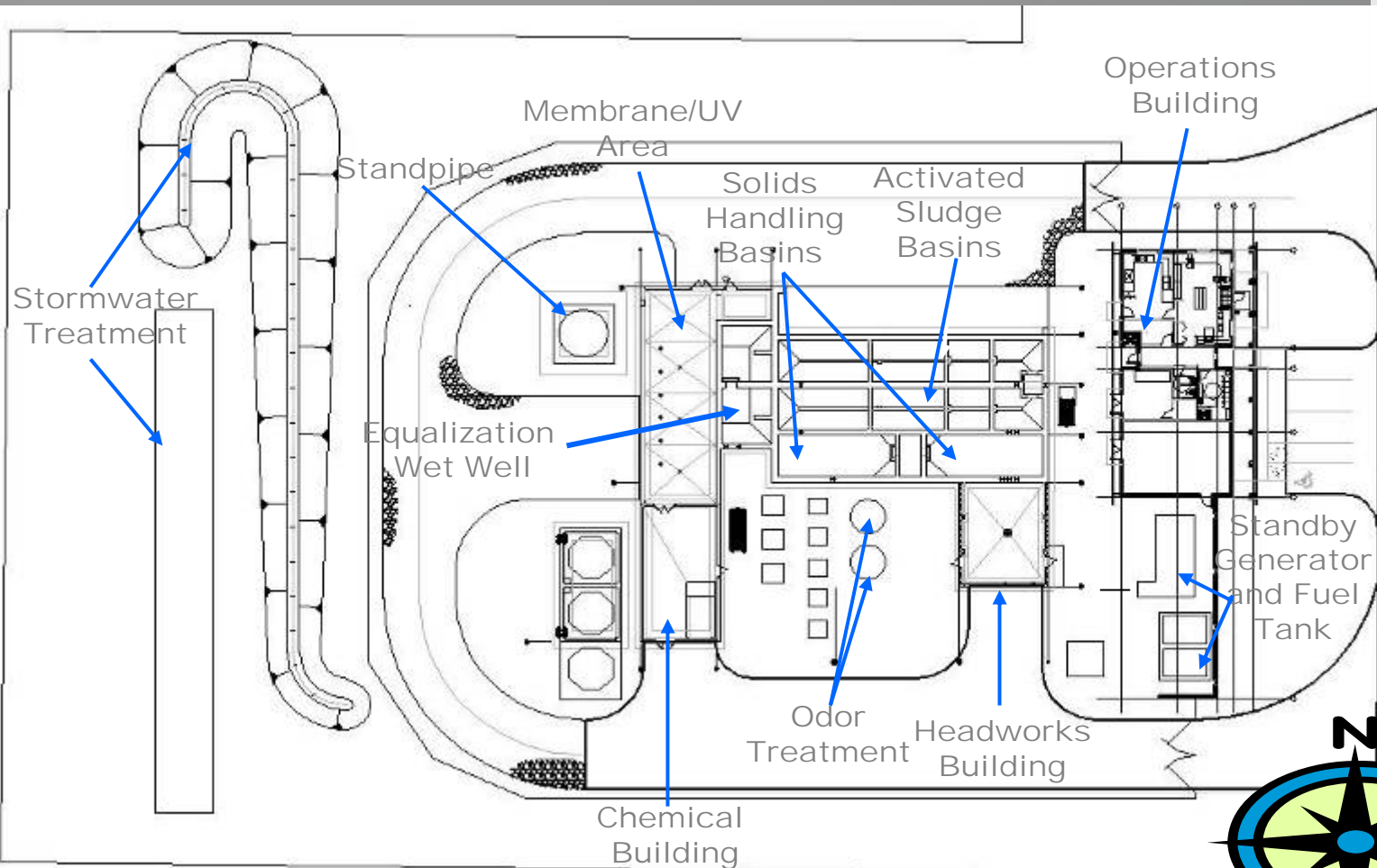
# Class A Reclamation Standards with MBR Treatment

Similar to California's Title 22, Idaho's Class A, and Oregon's Level IV

|                      |  |                          |
|----------------------|--|--------------------------|
| Allowable Use        | Most non-potable activities                      | MBR treatment            |
| Treatment            | Oxidation, coagulation, filtration, disinfection |                          |
| Total Coliform       | < 2.2 col/100 mL/7 d, 23 col/100 mL max          |                          |
| Turbidity            | 2.0 NTU avg, 5.0 NTU max                         |                          |
| Public Access/Buffer | unrestricted                                     | 0.2 NTU avg, 0.5 NTU max |



# Treatment Plant Site Plan





# UV Disinfection

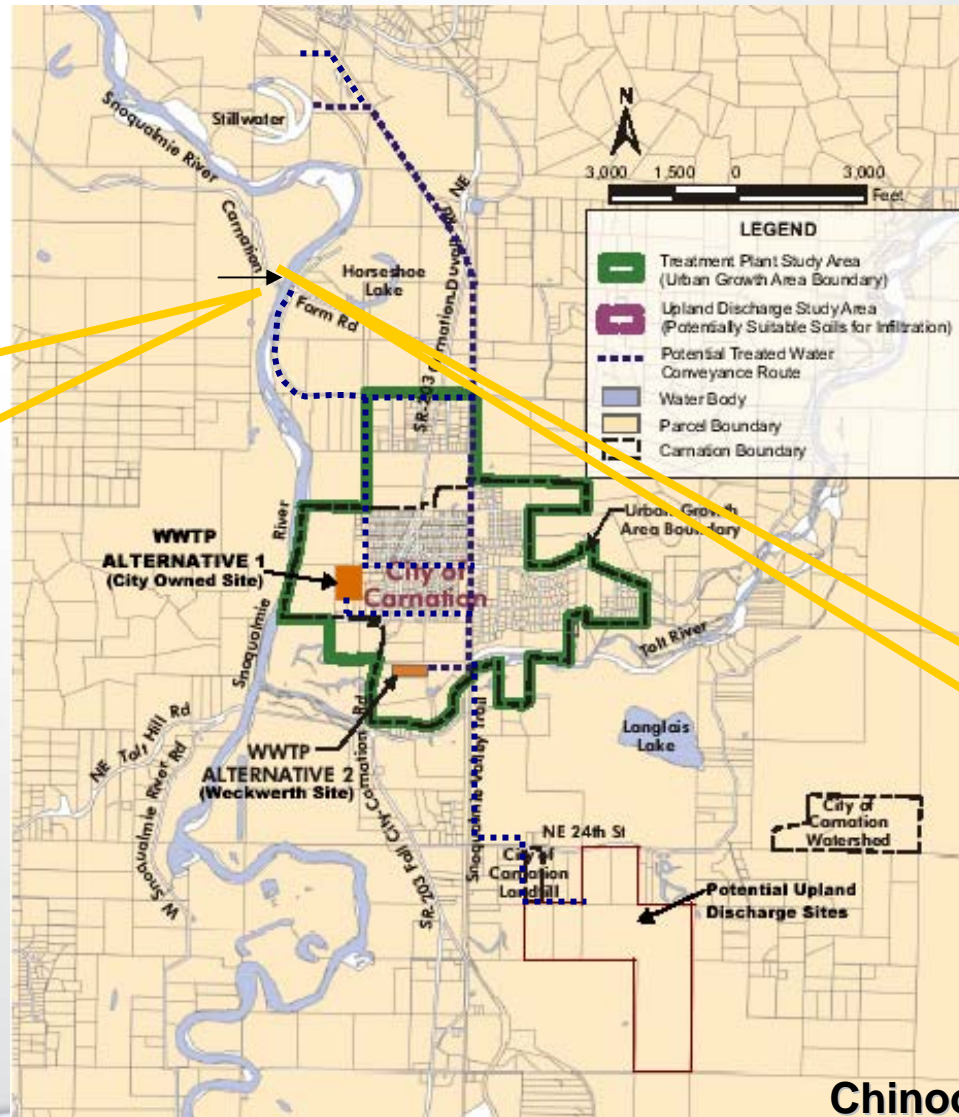


- ✓ Closed vessel system
- ✓ Automated mechanical cleaning
- ✓ Two trains (1 duty, 1 standby)
- ✓ Disinfection meets NWRI and reclaimed water requirements

# Selected Discharge Alternatives

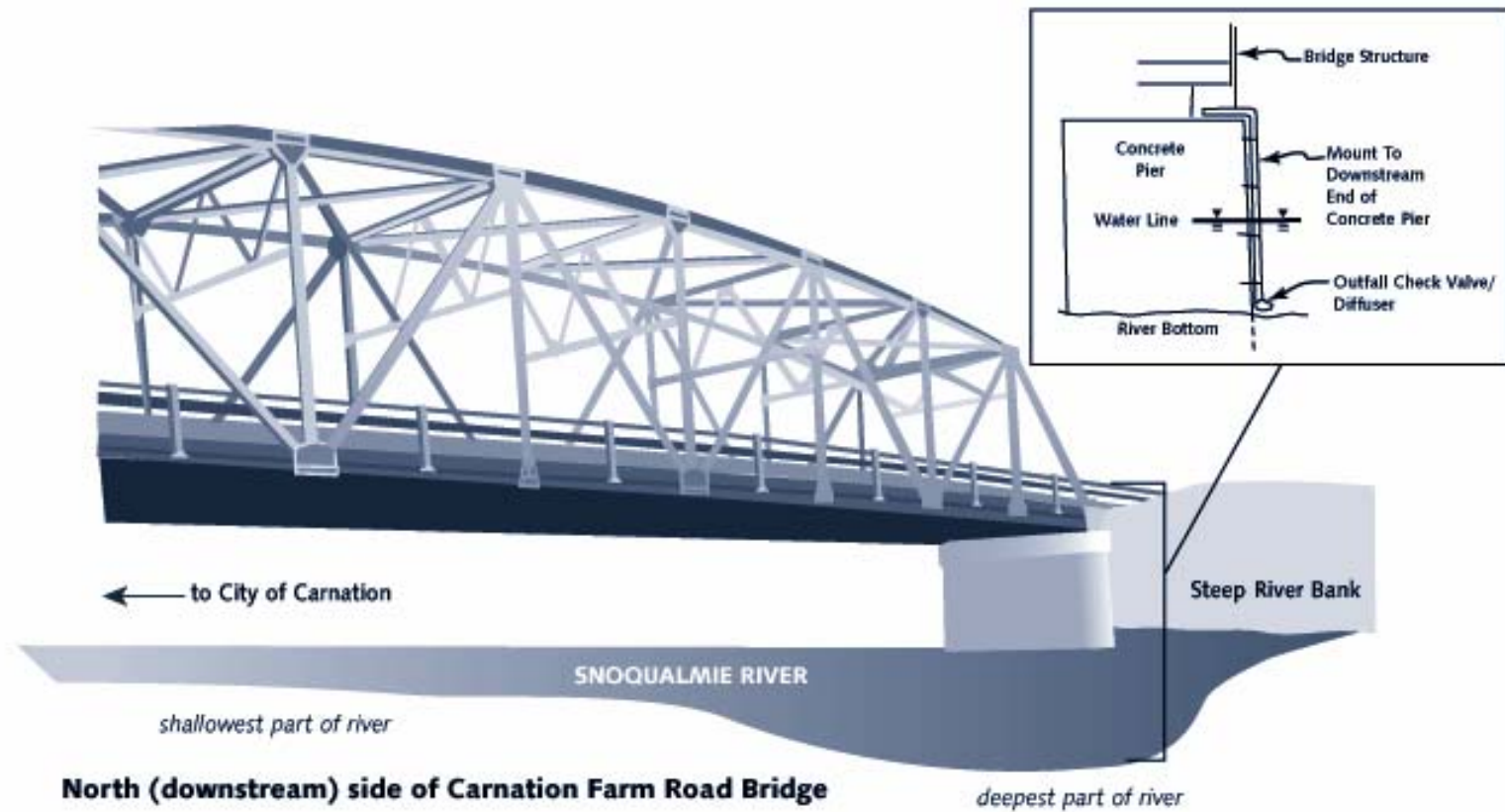


**Snoqualmie River—  
backup discharge**



**Chinook Bend Enhancement—  
Primary discharge**

# Returning water back to the river without adverse impacts





# Discharge Design



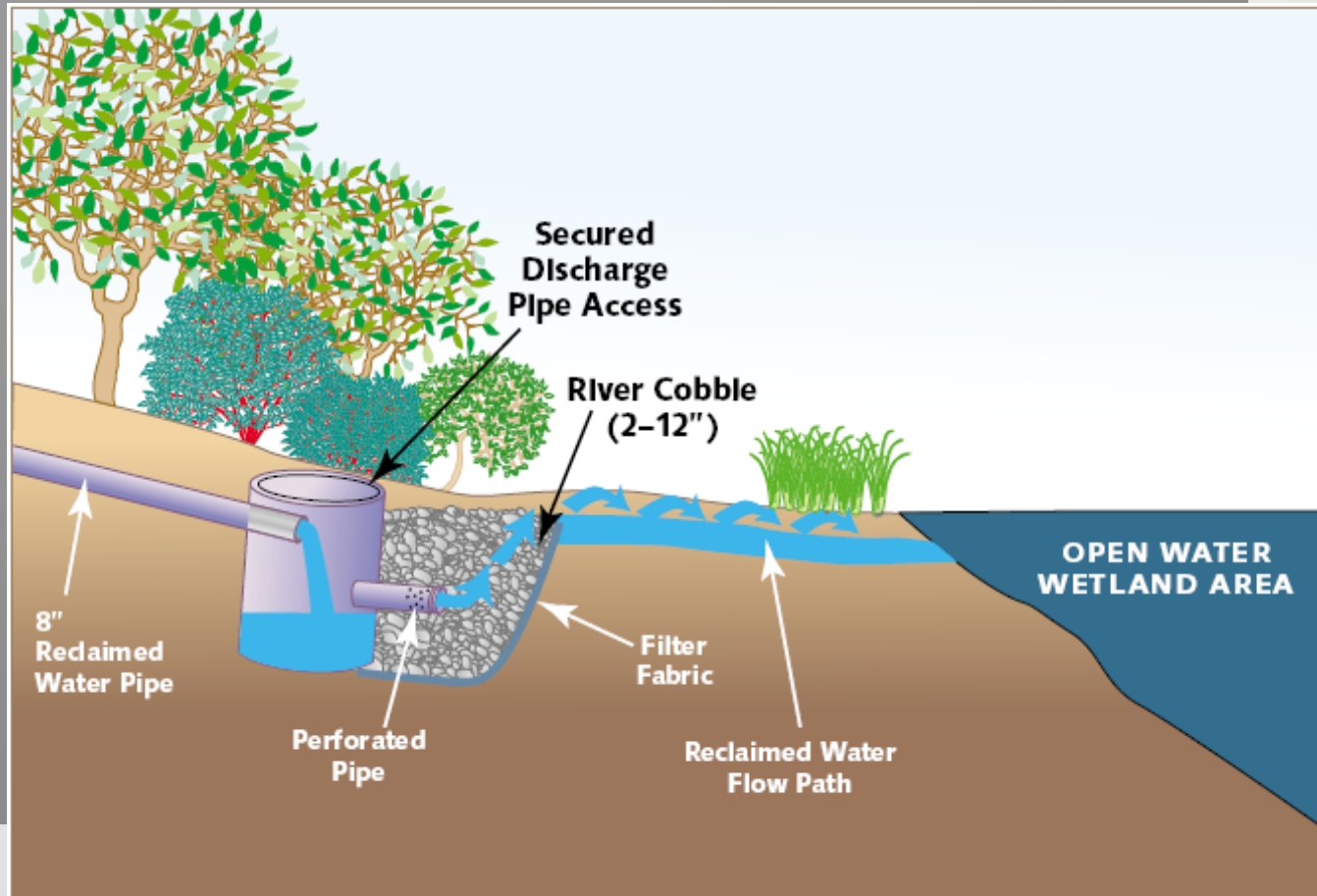
- ✓ Dual discharge
- ✓ No COE permit
- ✓ No river bed impacts
- ✓ Maintain aesthetics to historical bridge
- ✓ Protect from Floating Debris

# Chinook Bend Wetlands Site



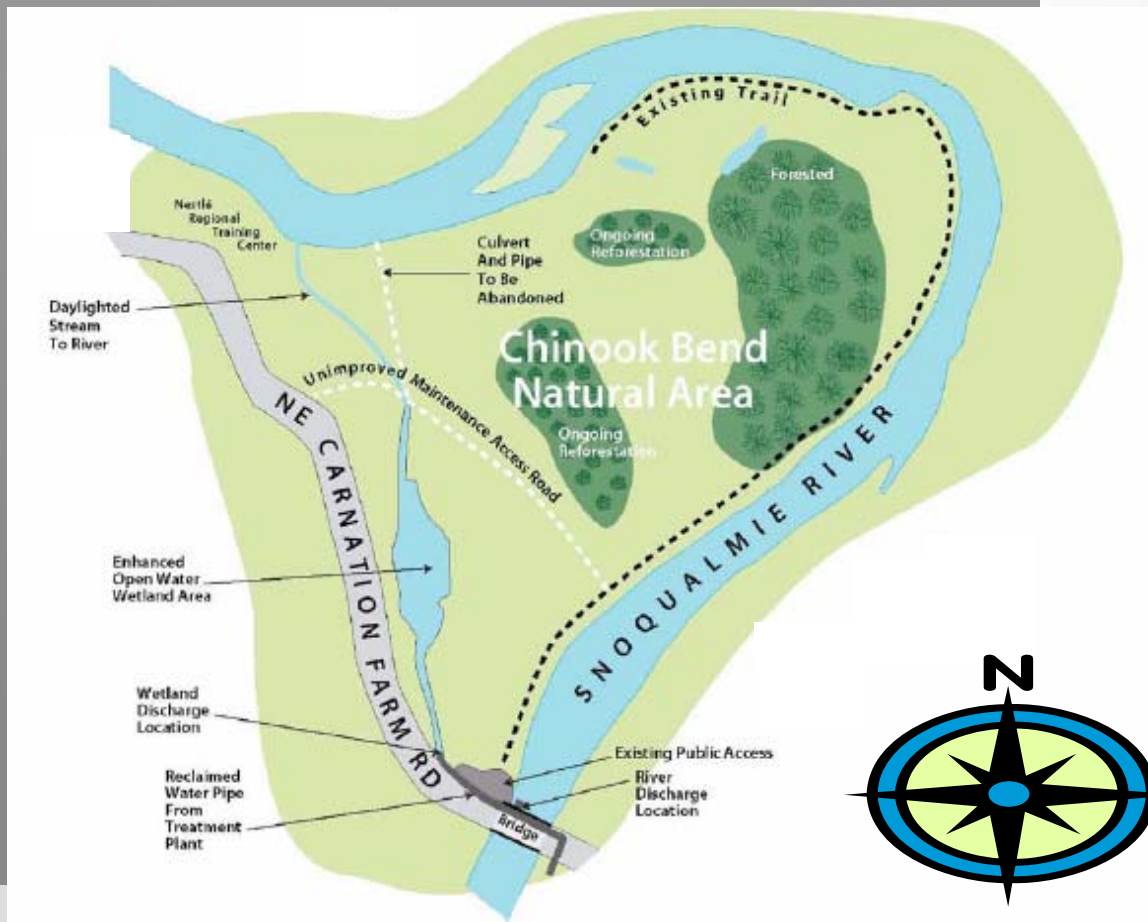
- Close to Outfall Location (300')
- King County's open space and habitat protection

# Conceptual Discharge





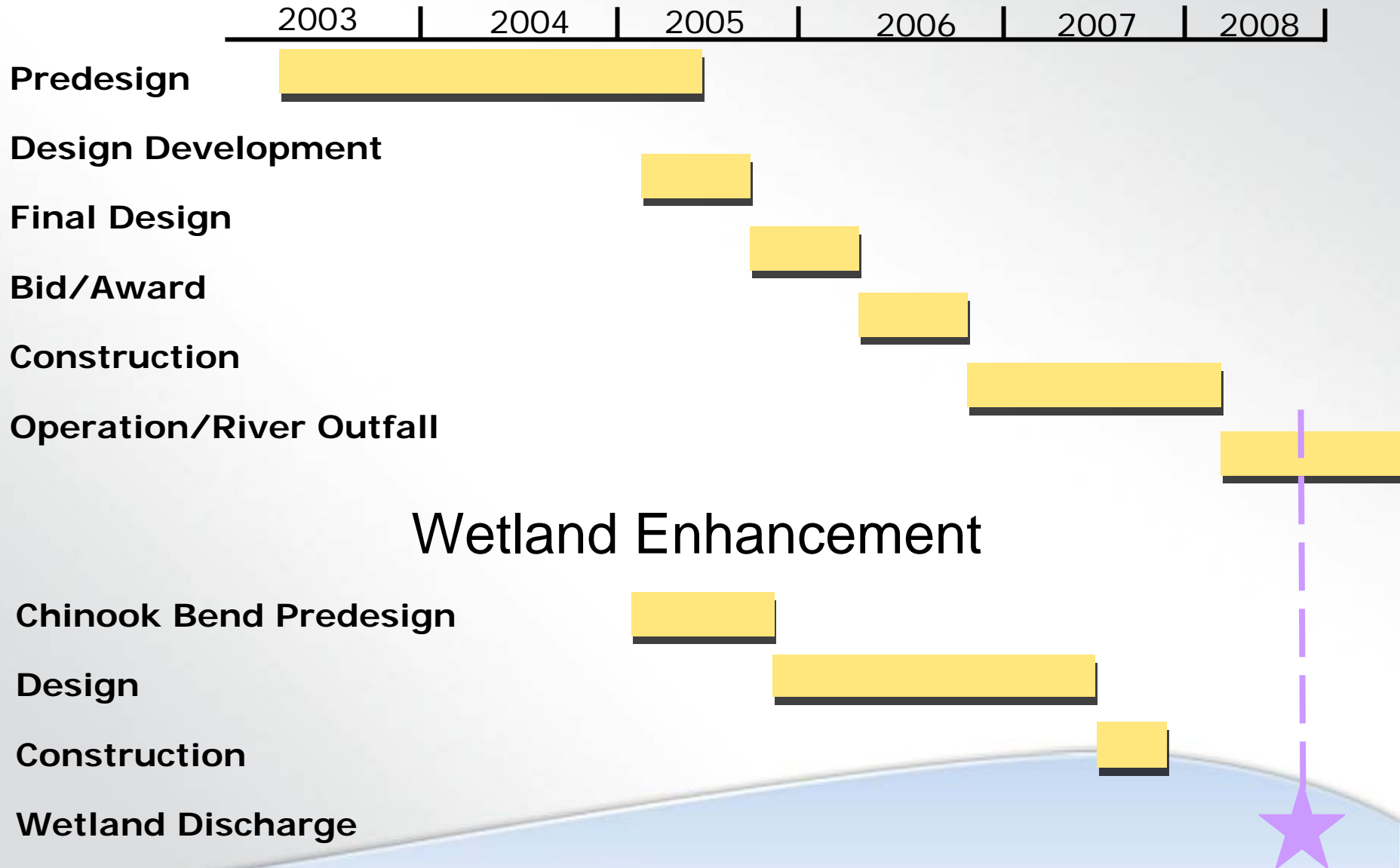
# Forested Floodplain Enhancement



- Up to 10 acres
- Multiple sources of water
- Native plantings
- Surface stream flow restoration
- Increase topographic complexity



# Project Schedule



# Successful Grant Funding for wetland enhancement

## *Ducks Unlimited*

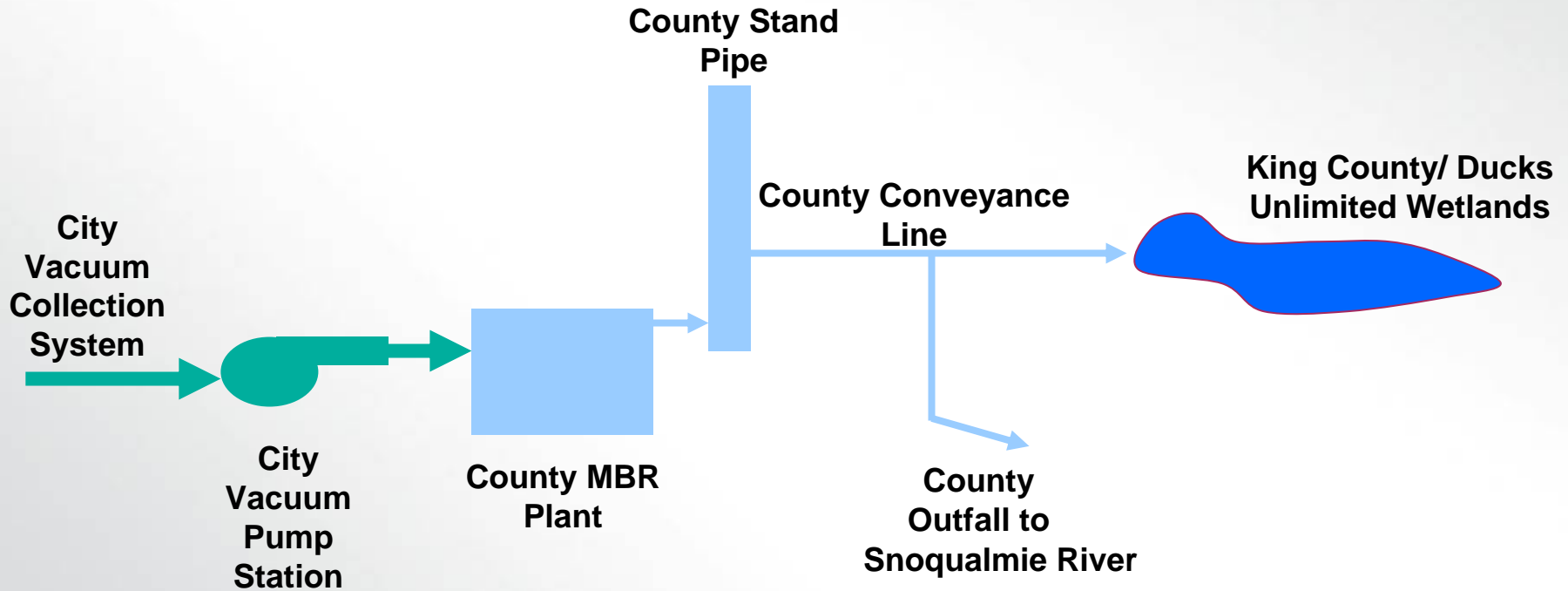
- ✓ North American Wetland Conservation Act Grant (\$122,000)
- ✓ (USDA) King Conservation District (\$14,000)
- ✓ King County WaterWorks Grant (\$30,000)

## *King County WTD*

- ✓ Interagency for Outdoor Recreation Aquatic Lands Enhancement Account (\$297,350)

**Total of \$463,000 received**

# Tour Overview of the project partnerships



**Let's go take a tour of  
these facilities!**

